

Unilateral, Early Onset, Pediatric Necrobiosis Lipoidica, in a Diabetic Boy: An Extremely Rare Occurrence

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1. Abstract

Necrobiosis Lipoidica (NL) is a chronic, idiopathic, granulomatous dermatosis, of collagen degeneration. Yellow-brown, centrally waxy, atrophic, telangiectatic plaques, are its usual presentation, mostly over the pretibial region, with an elevated violaceous rim, regularly bilaterally, but rarely unilaterally, with or without ulceration. Childhood-onset, bilateral NL in typical locations, are rarely reported, but unilateral involvement has not been reported before. We report a case of type 1 diabetic 9-year-old boy, who developed at the age of 2 years, which also has been not reported before, three centrally, atrophic yellow plaques with telangiectasia, and brown elevated rim over the right pretibial area only, while the left side is not affected.

2. Introduction

Necrobiosis lipoidica (NL) is a chronic, idiopathic granulomatous dermatosis, first described in 1929, by the Austrian dermatologist Moritz Oppenheim, as dermatitis atrophicans lipoides diabetica, and renamed, in 1932, by his colleague, Erich Urbach as necrobiosis lipoidica diabetorum [1-3].

Since cases of NL in non-diabetic patients were increasingly reported, a broader term “necrobiosis lipoidica”, encompassing all patients regardless of having DM, or not, was suggested [4].

Females 20–30 years old, are commonly affected, with earlier onset in diabetic patients. Up to 1.2% of diabetic patients, are afflicted, and up to 13% of NL patients, were found to have thyroidopathy. In up to 14% of patients, NL precedes a diagnosis of diabetes,

in up to 24%, it is diagnosed simultaneously, and in up to 62%, it appears after a diagnosis of diabetes [5]. Usually, it manifests as yellow-brown, plaques, with telangiectasia, an atrophic center, and an elevated violaceous rim, routinely over the pretibial areas bilaterally, sometimes complicated by ulceration [5-8].

3. Case Report

A 9-year-old boy, diagnosed with type 1 diabetes since the age of 2 years, presented to our dermatology clinic complaining of three asymptomatic, irregularly shaped, centrally atrophic yellow-brown plaques with prominent telangiectasia measuring 2-8 × 1-4 cm over the right pretibial area since 7years (Figure 1-3). According to his father, these skin lesions appeared 3 months prior to diagnosis of diabetes type1, and they were preceded by trauma to this area, one month before. A thorough mucocutaneous examination revealed no abnormality. His physical examination including his developmental milestones, were unremarkable. Type 1 diabetes, was diagnosed, at the age 2 years, and he is on insulin therapy since then. At the time of presentation, he had no systemic symptoms or complaints. His fasting blood glucose level (17.6 mmol/L) and hemoglobin A1c (11.6%) were elevated. Otherwise, his complete blood count, liver enzymes, urea, creatinine, thyroid function tests, serum and urine protein electrophoresis, and urinalysis were within normal ranges. He has a positive family history of type 2 diabetes mellitus, in his paternal grandfather. Only topical retinoid cream, and moisturizer were administrated. A follow-up after, one, then after 7 weeks showed progressive improvement of the lesion (figure 4-6).



Figure 1: At presentation. Overview. Three, annular pink-brown plaques with slightly atrophic, pale yellow center, telangiectasias, and slightly elevated brown rim, over anteromedial pretibial area of right shin.



Figure 2: At presentation. Closeup view. The lower medial plaque is pale yellow, and the lateral upper plaque, is more yellow, and telangiectasias, are more prominent .



Figure 3: At presentation. Closeup view. The upper plaque is covered with prominent telangiectasias, over a yellow back ground.



Figure 4: One week after topical treatment with Tretinoin 0.05 % cream. overview. Strict right unilateral involvement.



Figure 5: One week after topical treatment with Tretinoin 0.05 % cream. Close up view.



Figure 6: seven weeks after topical treatment with Tretinoin 0.05 % cream. Close up view. Telangiectasias are easily visible, over a white-yellow back ground.

4. Discussion

NL is a chronic, idiopathic granulomatous dermatosis, affecting predominantly, women 20–30 years of age, principally involving the pretibial region, bilaterally, sometimes accompanied by ulceration [4, 5]. Pediatric NL cases, especially those that started before 5 years of age, are very rare, and typically seen bilaterally over pretibial areas [7]. NL typically affects, middle-aged female, with a female: male ratio of 3:1. The average age at presentation is 25 years for diabetic patients, and 46 years for nondiabetic patients [8].

NL is characterized by, centrally depressed, yellow-brown, plaques with, telangiectasias, and raised purple border, typically pretibial, and mostly bilateral. Less frequently reported anatomic areas for NL are the upper limbs, face, and scalp [9]. To the best of our knowledge, No, pediatric cases of NL with unilateral involvement of the legs, have been reported. 11 cases of NL in children were reviewed by Pestoni et al., all of which were found on the distal

parts of lower, and upper extremities, without isolated cases of unilateral leg involvement [9]. Out of 35 adults with NL, reviewed by Marcoval et al. 6 were male (17%), and 29 were female (83%) [10]. Chernosky et al. reported a 3-year-old, type 1 diabetic girl with NL over both legs [9]. Our patient is exceptional in many facets, as he had a very early age of onset at the age of 2 years (2-3rd decade in type 1 diabetes), unilateral involvement, and the male gender (male: female ratio 1:3), all of them are very rarely encountered. He had multiple, asymptomatic, round to oval plaques over his right shin only, which to the best of knowledge, has only, been reported in 4 adults, (in 2 males, and 2 females), but not in pediatric patients [8-11]. In addition, it was found that only 4 of the 11 cases reported by Pestoni et al. have their onset before the age of 9 years, which advocates our patient had a very young age (at the age of 2 years old) of onset of NL [9].

NL is usually a clinical diagnosis, but if the clinical presentation is atypical, skin biopsy should be performed, to confirm the di-

agnosis of NL, and to exclude other conditions like, sarcoidosis, necrobiotic xanthogranuloma, and granuloma annulare [11].

Dermoscopy may be used as an alternative tool for confirmation of the diagnosis, which can also differentiate early, from advanced lesions of NL [16].

Early lesions show, comma- or hairpin-shaped vessels whereas advanced ones have an irregular pattern of arborizing vessels. The vascular plexus presents in the reticular dermis correspond to the arborizing telangiectasias, and the papillary vessels that become more visible because of the inflammation and atrophic changes secondary to the degeneration of connective tissue, correspond to the hairpin-like vessels, seen by dermoscopy. These findings could be explained by early visualization of the papillary vessels, followed later, as atrophy progresses, by increasing visibility of the vessels of the deep plexus. Moreover, yellow-to-orange patches correspond to granulomatous inflammation and whitish areas to degenerated collagen [15, 16].

NL among children with type 1 diabetes, is extremely rare, with a prevalence of 0.06%; while the overall prevalence among diabetics of all age groups is 0.3–1.2% [19]. Unclear is the association between Insulin dependent diabetes mellitus (IDDM), and NL. Furthermore, it has been postulated that the microangiopathic changes recognized among diabetic patients may lead to the development of collagen degeneration and consecutive dermal inflammation [8]. A prevalence of 0.06%, for NL among diabetic children, was calculated by De Silva et al., as he only found one 15-year-old girl out of 1,557, diagnosed by a dermatologist with NL [19]. No additional cross-sectional studies, have been executed on NL in children.

The histopathological aspects are variable, determined partly by the existence or non-existence of concurrent diabetes mellitus and the area of biopsy. More typical of the diabetes-related variant, is the palisading granuloma with necrobiosis, where as more often a feature of nondiabetes-related necrobiosis, is a granulomatous sarcoidal type of reaction. A diffuse palisaded and interstitial granulomatous dermatitis involving the entire dermis and extends into the subcutaneous fat septae is usually seen, if a biopsy is taken from the palpable inflammatory border. Histiocytes surrounding horizontal tiers of degenerated collagen, are the components of the, “layered” tiers of granulomatous inflammation. Instead, focal loss of elastic tissue may be seen, if the biopsy is performed from sclerotic sites. A concomitant, perivascular infiltrate, superficial and deep is largely lymphocytic but frequently contains plasma cells and at times eosinophils [8]. A rare finding, are the cholesterol clefts, which may hardly be conspicuous [20].

Ulceration is the most common complication of NL; seen in up to 35% of NL patients, mostly after minor trauma. Erfurt-Berge, reported that ulceration of NL was observed in 25% of all patients, and in 37.5% with concomitant diabetes mellitus. Further, ulcerations were predominantly in males (58%) [4, 5]. Squamous

cell carcinoma (SCC), a serious complication, has been rarely, reported to develop inside lesions of NL. It is however unknown if long-standing NL leads to transformation into SCC, or if these lesions are stimulated by chronic inflammation to transform into malignant tumors [7, 21].

Unfortunately, there is no proven effective treatment for NL to date. The disease remit Spontaneously in 17% of 171 patients, after a median of 8–12 years [8]. Potent topical corticosteroids (including under occlusion, and intralesional), are normally the first-line treatment option, along with avoidance of trauma and wound care of ulcers. Unfortunately, they have the side effect of worsening the present atrophy, hence we preferred topical retinoids, because they can improve this atrophy, which resulted in two single-case reports in a significant reduction in the atrophic element of NL, and are thought to promote wound healing by influencing angiogenesis and collagen formation [23–25]. Steroids and retinoids have antagonistic actions regarding wound healing [25]. Various treatment modalities including systemic corticosteroid, antimalarials, niacinamide, mycophenolate mofetil, doxycycline, colchicine, methotrexate, thalidomide, TNF- α inhibitors, cyclosporine, PUVA, UVA1 phototherapy, fractional CO2 laser, or photodynamic therapy, are in accordance with case series or prospective uncontrolled studies [26–28]. Long-term follow-up is crucial to keep an eye on for early signs of malignant transformation to SCC, or ulcerations.

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